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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,773	11/17/2003	Hiroshi Yoshino	ELPIDA 03USFP934	2414

27667 7590 06/01/2007

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EXAMINER	
RAYMOND, BRITTANY L	

ART UNIT	PAPER NUMBER
1756	

MAIL DATE	DELIVERY MODE
06/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/714,773	YOSHINO, HIROSHI	
	Examiner	Art Unit	
	Brittany Raymond	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 25-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 25-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 25-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (U.S. Patent 6348301) in view of Rangarajan (U.S Patent 6238830) and Whiting (U.S. Patent 6235439).

Lin discloses a method for reducing a critical dimension of a patterned photoresist layer comprising: forming a film layer over a substrate, coating the film layer with a photoresist layer, soft-baking the photoresist, exposing the photoresist, post-exposure baking the photoresist, developing the photoresist, hard-baking the photoresist, and etching the film layer by using the photoresist layer as a mask (Columns 3-4, Lines 46-9), as recited in claims 25 and 32 of the present invention. The post-exposure baking step has a first baking step, which uses a temperature that is

higher than the melting point of the photoresist layer, and a second baking step, which uses a temperature that is selected such that the width of the opening is reduced linearly as the heating time increases (Column 3, line 66 to Column 4, Line 5), or so that a desired variation of dimensions is reached, as recited in claims 25, 27, and 32 of the present invention. Lin also discloses that the baking steps are performed using hot plates (Paragraph 3, Lines 62-65), which is the equality of a heater block, as recited in claim 29 of the present invention. The step of removing the resist pattern, as recited in claim 32, is depicted in Figures 4B and 4C.

Lin fails to disclose that the temperature data is collected during the first time period, that the second treatment temperature is calculated from temperature variance dependency data and the temperature data collected, that the data is stored in a computer, the temperature data is collected by temperature sensors, and that the sensors and heater blocks are controlled by a computer.

Rangarajan discloses a system and method for controlling temperature in a lithography process comprising: providing a substrate with a resist layer on top (Column 5, Lines 10-11), using a detection and measuring system to detect a fluorescence which is used to determine the temperature of respective portions of the resist (Column 6, Lines 14-30), and using the resist temperatures to adjust the temperatures at each location on the resist (Column 8, Lines 20-31), as recited in claims 25 and 32 of the present invention. Rangarajan also discloses that the detection and measuring system includes one or more photodetectors (Column 6, Lines 17-18), as recited in claim 28 of the present invention. Rangarajan states that a memory is included in the system that

is used to carry out operating functions in the system (Column 6, Lines 41-45), as recited in claims 30 and 31 of the present invention. Rangarajan also states that the memory also serves to store information such as resist temperature and temperature tables (Column 6, Lines 51-53), as recited in claim 26 of the present invention.

Whiting discloses a method for controlling the image size of integrated circuits comprising: providing a wafer onto a hot plate (Column 4, Lines 7-10), providing a nominal temperature setpoint to all zones on the hot plate (Column 5, Part a), and using the nominal temperatures and temperature dependency data relative to image size to determine a change in temperature of the hot plate (Claim 3), as recited in claims 25 and 32 of the present invention.

It would have been obvious to one of ordinary skill in this art, at the time of invention by applicant, to have modified the process of determining the second baking temperature of Lin by using temperature dependence data and the collected temperature data to help calculate the second baking temperature, as suggested by Whiting and Rangarajan because Whiting and Rangarajan teach that in order to produce a photoresist with desired dimensions, this data is needed to determine the temperatures to create those dimensions. It also would have been obvious to have used sensors and a computer memory to help perform the process of Lin, as suggested by Rangarajan, because Rangarajan teaches that these components are required in order to perform the calculations to determine a change in temperature of the hot plates.

Response to Arguments

3. Applicant's arguments filed 3/2/2007 have been fully considered but they are not persuasive.

Applicant argues that Lin or Whiting do not teach that a second temperature is calculated for a second heat treatment using data obtained in the first treatment period. Lin teaches that a first baking temperature is chosen based on a glass transition temperature, and that a temperature for the second baking step must be selected in order to reduce the width of an opening of the resist layer a certain amount during a particular time (Column 4, Lines 3-5). Lin does not state that the first baking temperature is used in determining the second baking temperature. However, Whiting discloses a method for using a first heating temperature in order to calculate a change in temperature of the hot plate and it would be obvious to have used this process of calculation with the first baking temperatures of Lin to determine a second heating temperature.

Examiner has also included the reference, Rangarajan, which discusses another process of determining a change in temperature and the system that performs this process. Rangarajan teaches the limitations of the dependent claims 26 and 28-31.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brittany Raymond whose telephone number is 571-272-6545. The examiner can normally be reached on Monday through Friday, 8:00 a.m. - 4:30 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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KATHLEEN DUDA
PRIMARY EXAMINER